FIG. 1

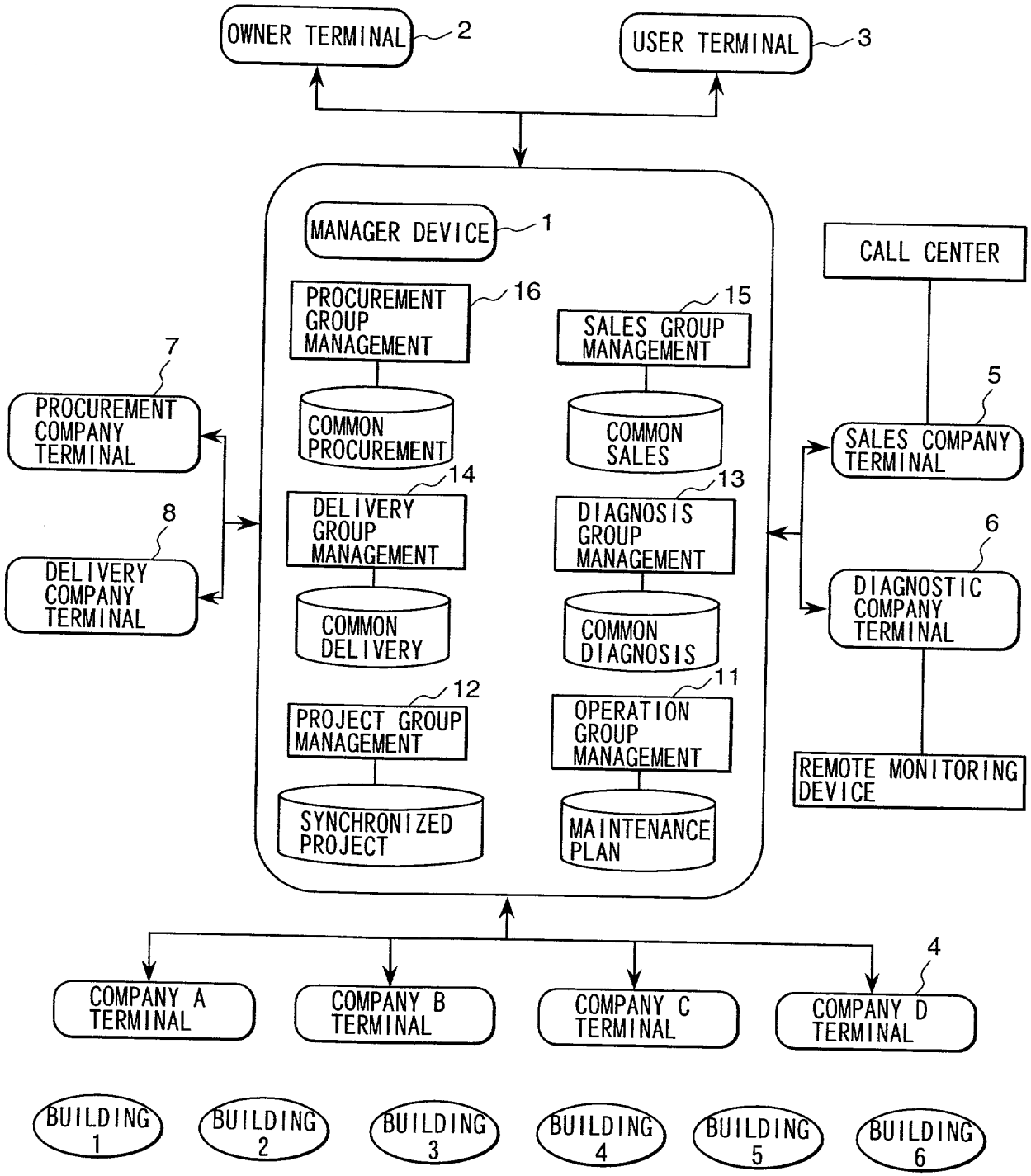

OWNER TERMINAL
2
USER TERMINAL
3
MANAGER DEVICE
1
CALL CENTER
PROCUREMENT GROUP MANAGEMENT
16
SALES GROUP MANAGEMENT
15
7
PROCUREMENT COMPANY TERMINAL
COMMON PROCUREMENT
COMMON SALES
5
SALES COMPANY TERMINAL
14
13
8
DELIVERY GROUP MANAGEMENT
DIAGNOSIS GROUP MANAGEMENT
6
DELIVERY COMPANY TERMINAL
COMMON DELIVERY
COMMON DIAGNOSIS
DIAGNOSTIC COMPANY TERMINAL
12
11
PROJECT GROUP MANAGEMENT
OPERATION GROUP MANAGEMENT
REMOTE MONITORING DEVICE
SYNCHRONIZED PROJECT
MAINTENANCE PLAN
4
COMPANY A TERMINAL
COMPANY B TERMINAL
COMPANY C TERMINAL
COMPANY D TERMINAL
BUILDING 1
BUILDING 2
BUILDING 3
BUILDING 4
BUILDING 5
BUILDING 6

FIG. 2

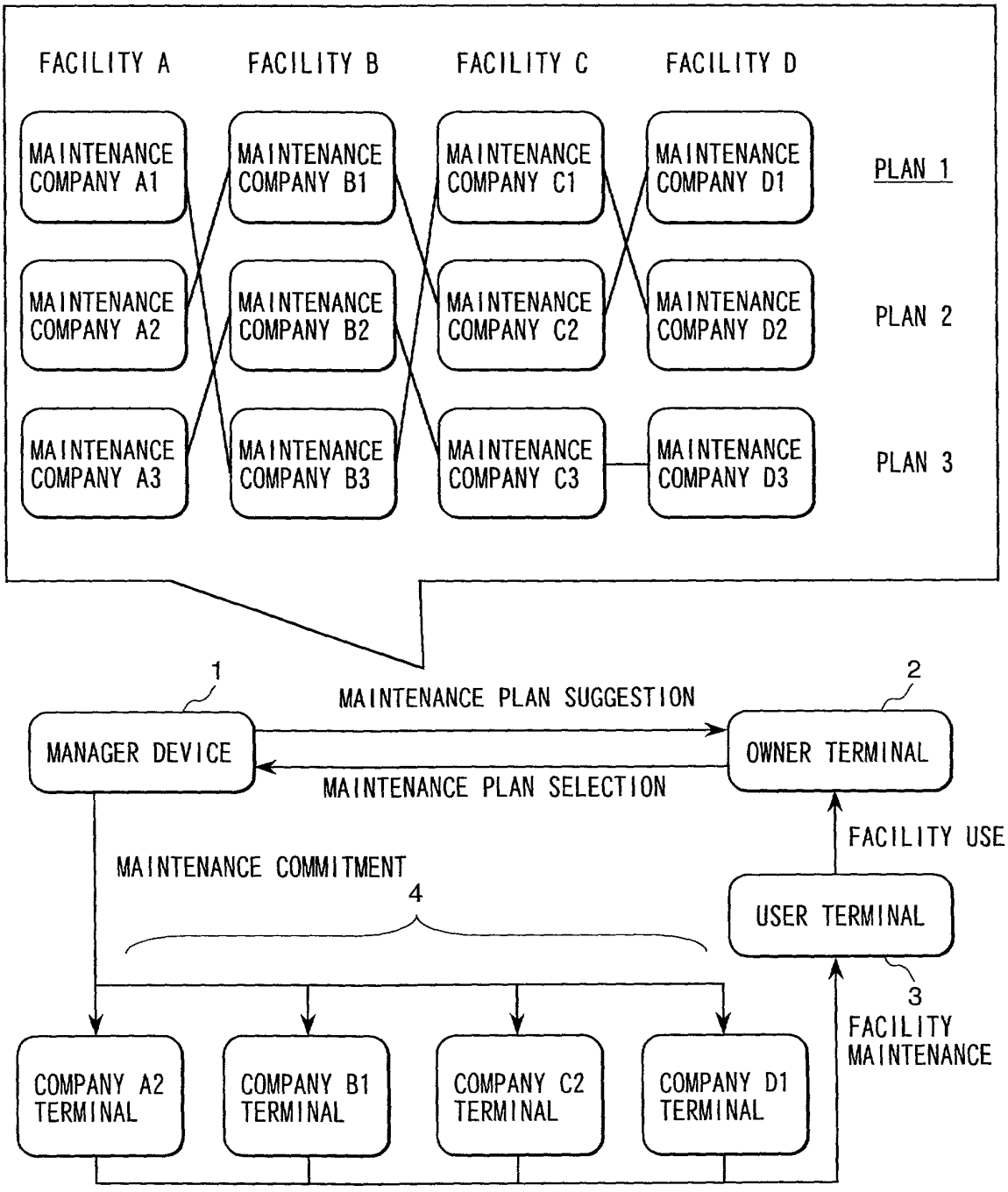

FACILITY A
FACILITY B
FACILITY C
FACILITY D
MAINTENANCE COMPANY A1
MAINTENANCE COMPANY B1
MAINTENANCE COMPANY C1
MAINTENANCE COMPANY D1
PLAN 1
MAINTENANCE COMPANY A2
MAINTENANCE COMPANY B2
MAINTENANCE COMPANY C2
MAINTENANCE COMPANY D2
PLAN 2
MAINTENANCE COMPANY A3
MAINTENANCE COMPANY B3
MAINTENANCE COMPANY C3
MAINTENANCE COMPANY D3
PLAN 3
1
MANAGER DEVICE
MAINTENANCE PLAN SUGGESTION
MAINTENANCE PLAN SELECTION
2
OWNER TERMINAL
FACILITY USE
MAINTENANCE COMMITMENT
4
USER TERMINAL
3
FACILITY MAINTENANCE
COMPANY A2 TERMINAL
COMPANY B1 TERMINAL
COMPANY C2 TERMINAL
COMPANY D1 TERMINAL

FIG. 3

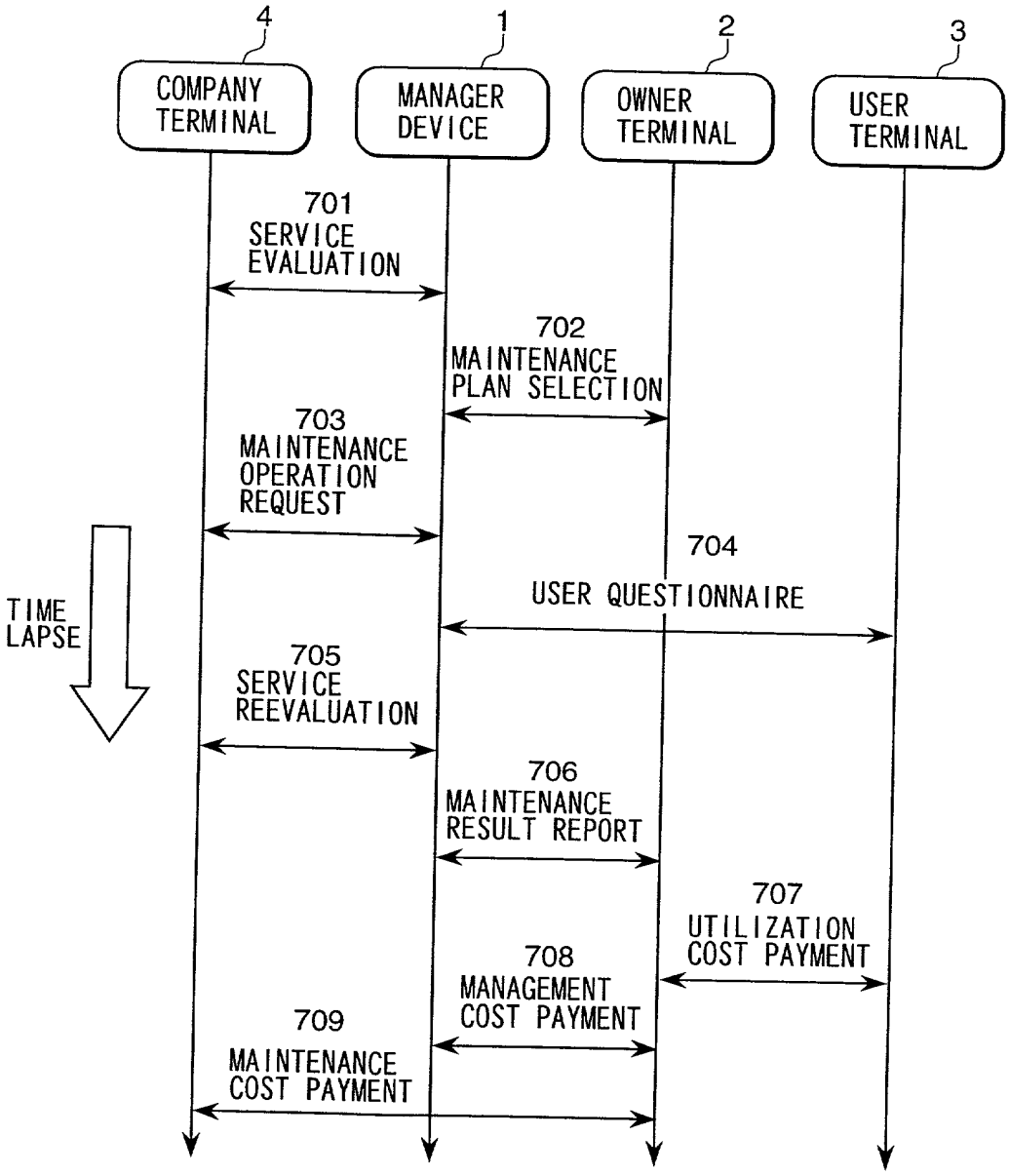

4
1
2
3
COMPANY TERMINAL
MANAGER DEVICE
OWNER TERMINAL
USER TERMINAL
701
SERVICE EVALUATION
702
MAINTENANCE PLAN SELECTION
703
MAINTENANCE OPERATION REQUEST
704
USER QUESTIONNAIRE
TIME LAPSE
705
SERVICE REEVALUATION
706
MAINTENANCE RESULT REPORT
707
UTILIZATION COST PAYMENT
708
MANAGEMENT COST PAYMENT
709
MAINTENANCE COST PAYMENT

FIG. 4

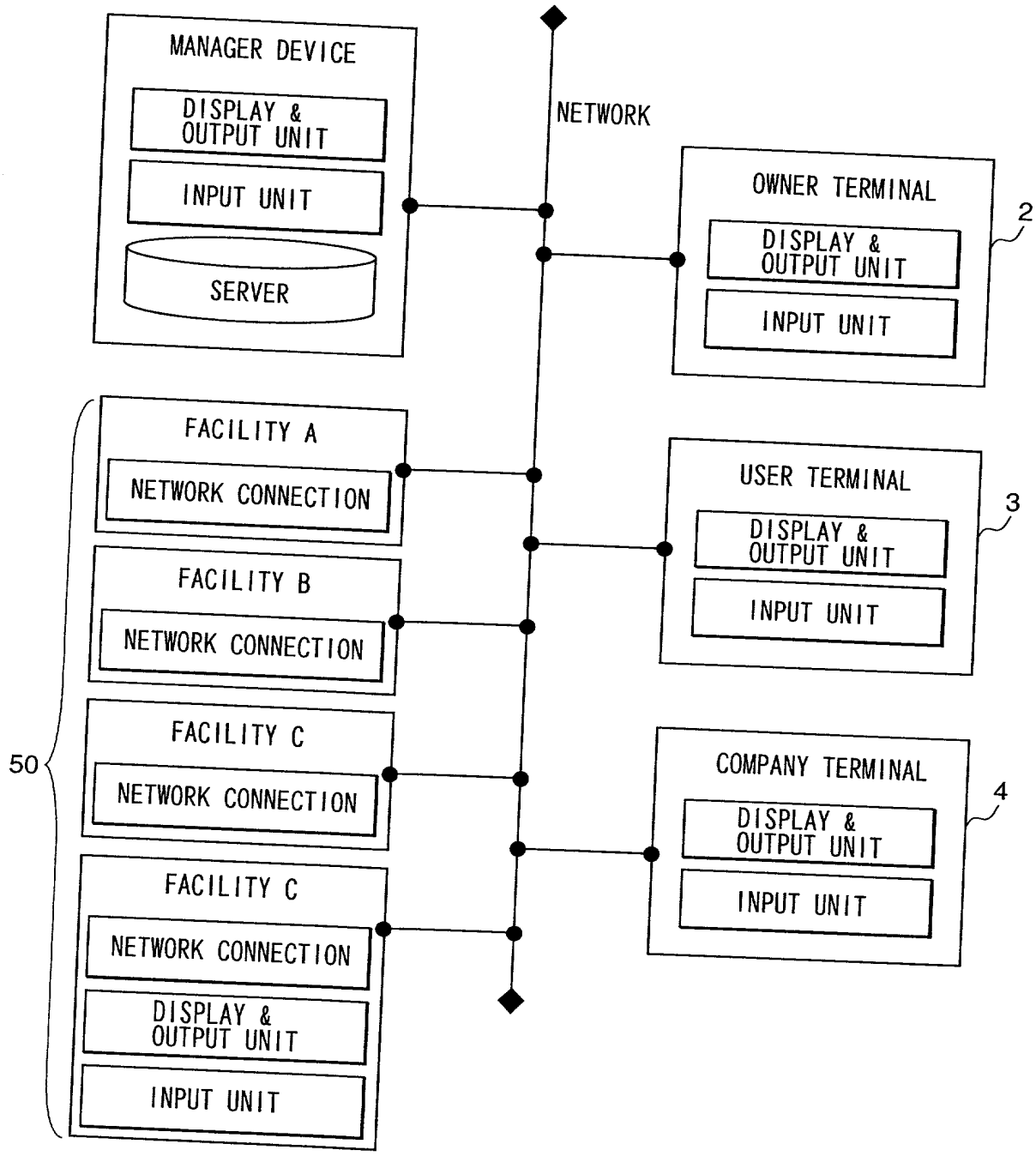

MANAGER DEVICE
DISPLAY & OUTPUT UNIT
INPUT UNIT
SERVER
NETWORK
OWNER TERMINAL
DISPLAY & OUTPUT UNIT
INPUT UNIT
2
FACILITY A
NETWORK CONNECTION
FACILITY B
NETWORK CONNECTION
FACILITY C
NETWORK CONNECTION
FACILITY C
NETWORK CONNECTION
DISPLAY & OUTPUT UNIT
INPUT UNIT
50
USER TERMINAL
DISPLAY & OUTPUT UNIT
INPUT UNIT
3
COMPANY TERMINAL
DISPLAY & OUTPUT UNIT
INPUT UNIT
4

FIG. 5

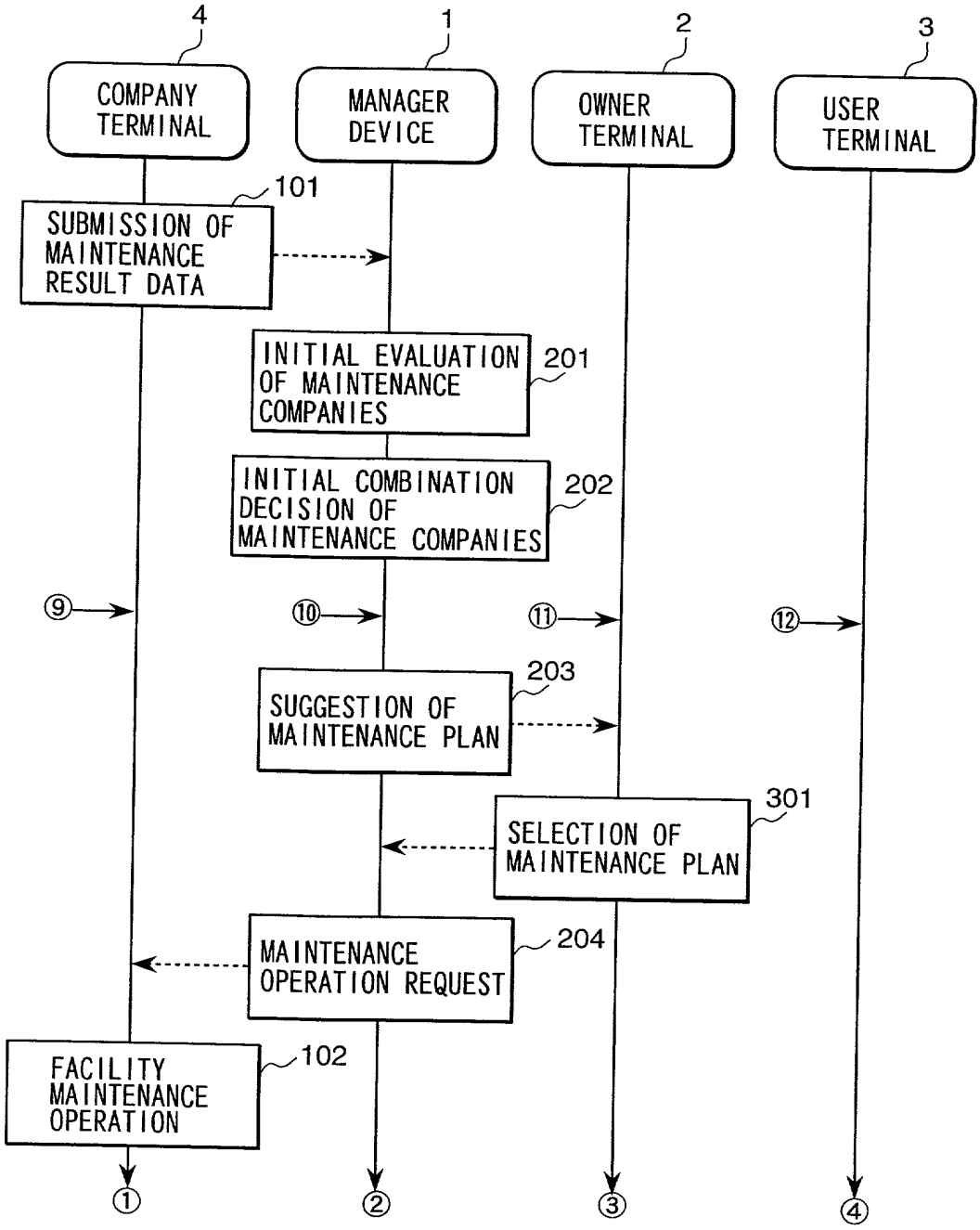

4
1
2
3
COMPANY TERMINAL
MANAGER DEVICE
OWNER TERMINAL
USER TERMINAL
101
SUBMISSION OF MAINTENANCE RESULT DATA
INITIAL EVALUATION OF MAINTENANCE COMPANIES
201
INITIAL COMBINATION DECISION OF MAINTENANCE COMPANIES
202
⑨
⑩
⑪
⑫
SUGGESTION OF MAINTENANCE PLAN
203
SELECTION OF MAINTENANCE PLAN
301
MAINTENANCE OPERATION REQUEST
204
FACILITY MAINTENANCE OPERATION
102
①
②
③
④

FIG. 6

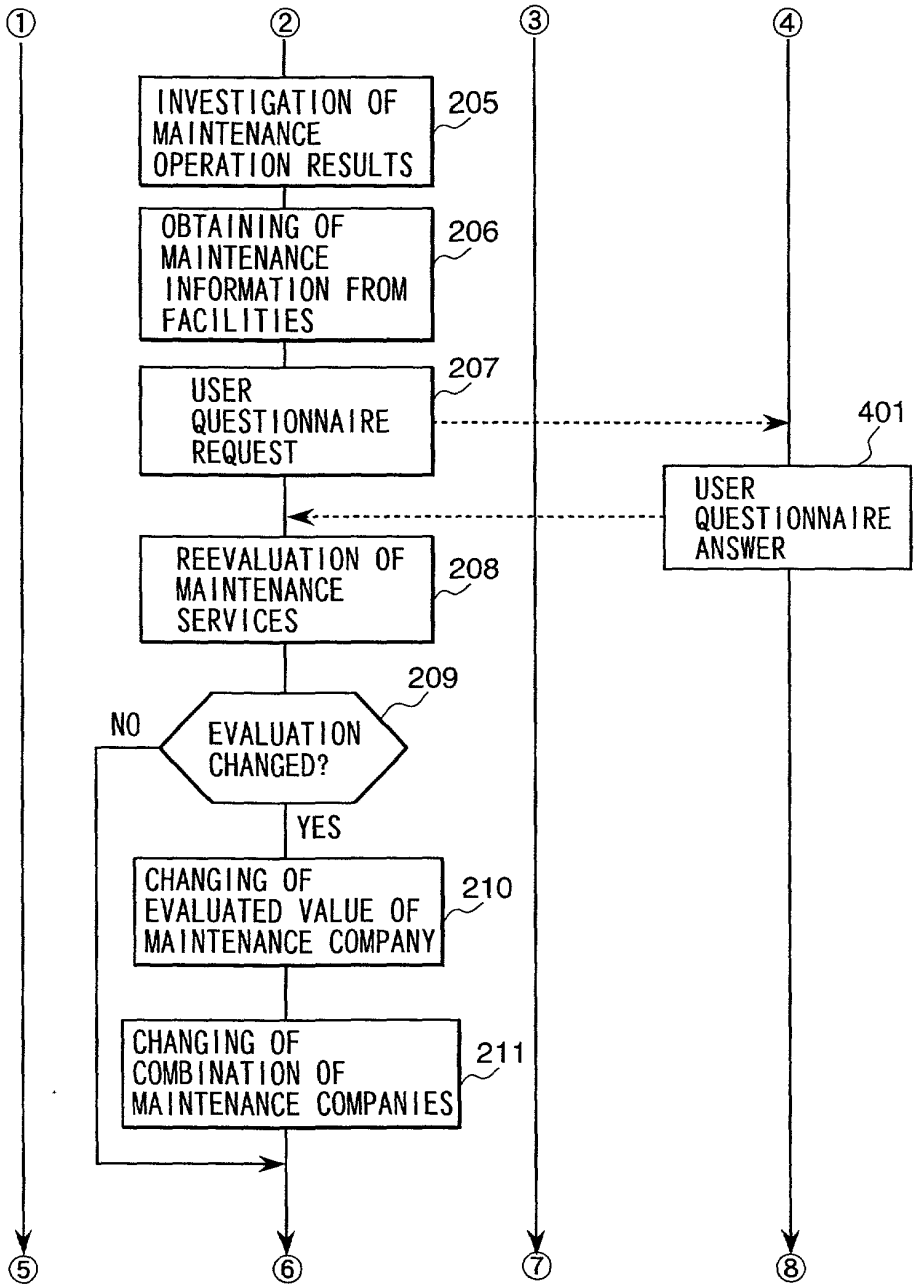

①
②
③
④
INVESTIGATION OF MAINTENANCE OPERATION RESULTS
205
OBTAINING OF MAINTENANCE INFORMATION FROM FACILITIES
206
USER QUESTIONNAIRE REQUEST
207
401
USER QUESTIONNAIRE ANSWER
REEVALUATION OF MAINTENANCE SERVICES
208
209
NO
EVALUATION CHANGED?
YES
CHANGING OF EVALUATED VALUE OF MAINTENANCE COMPANY
210
CHANGING OF COMBINATION OF MAINTENANCE COMPANIES
211
⑤
⑥
⑦
⑧

FIG. 7

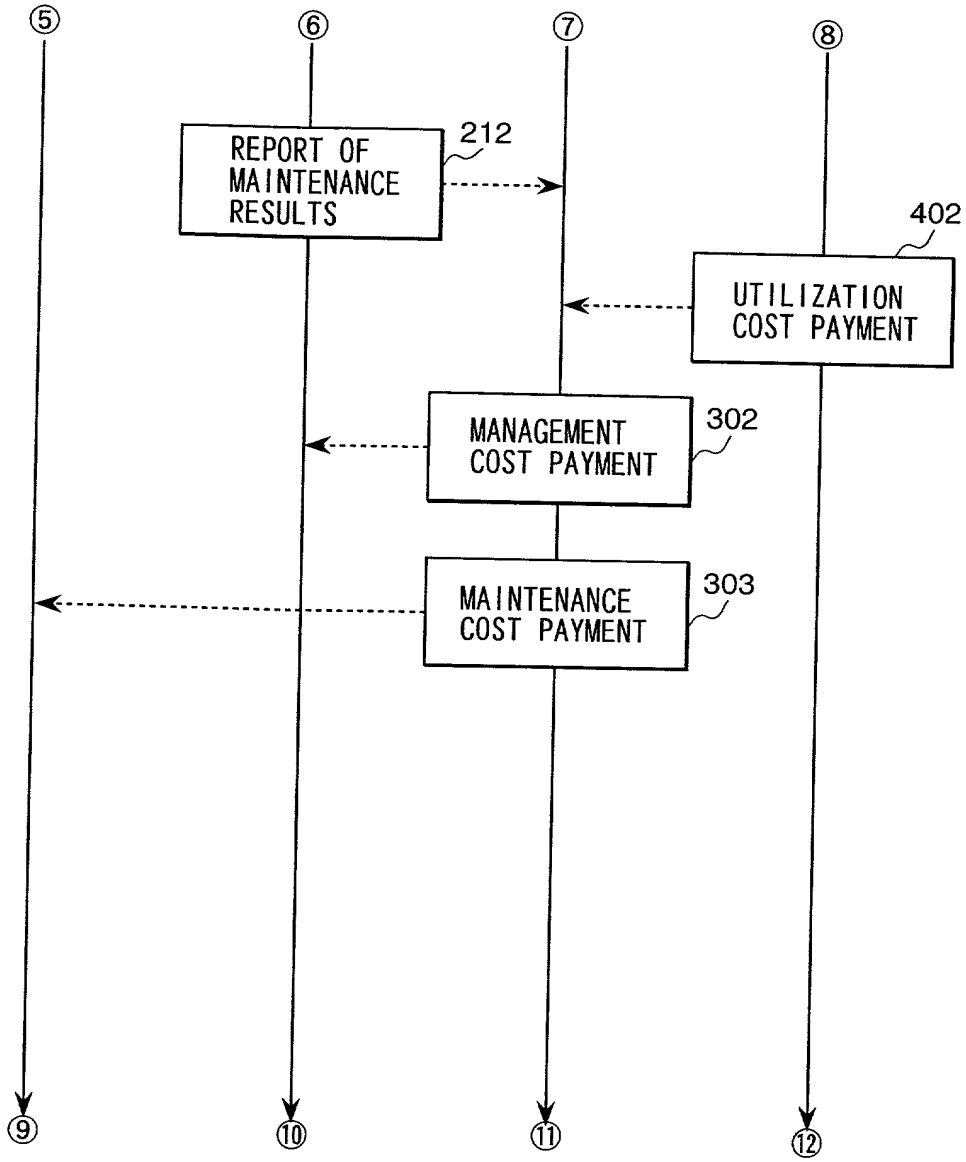

⑤
⑥
⑦
⑧
REPORT OF MAINTENANCE RESULTS
212
402
UTILIZATION COST PAYMENT
MANAGEMENT COST PAYMENT
302
MAINTENANCE COST PAYMENT
303
⑨
⑩
⑪
⑫

FIG. 8

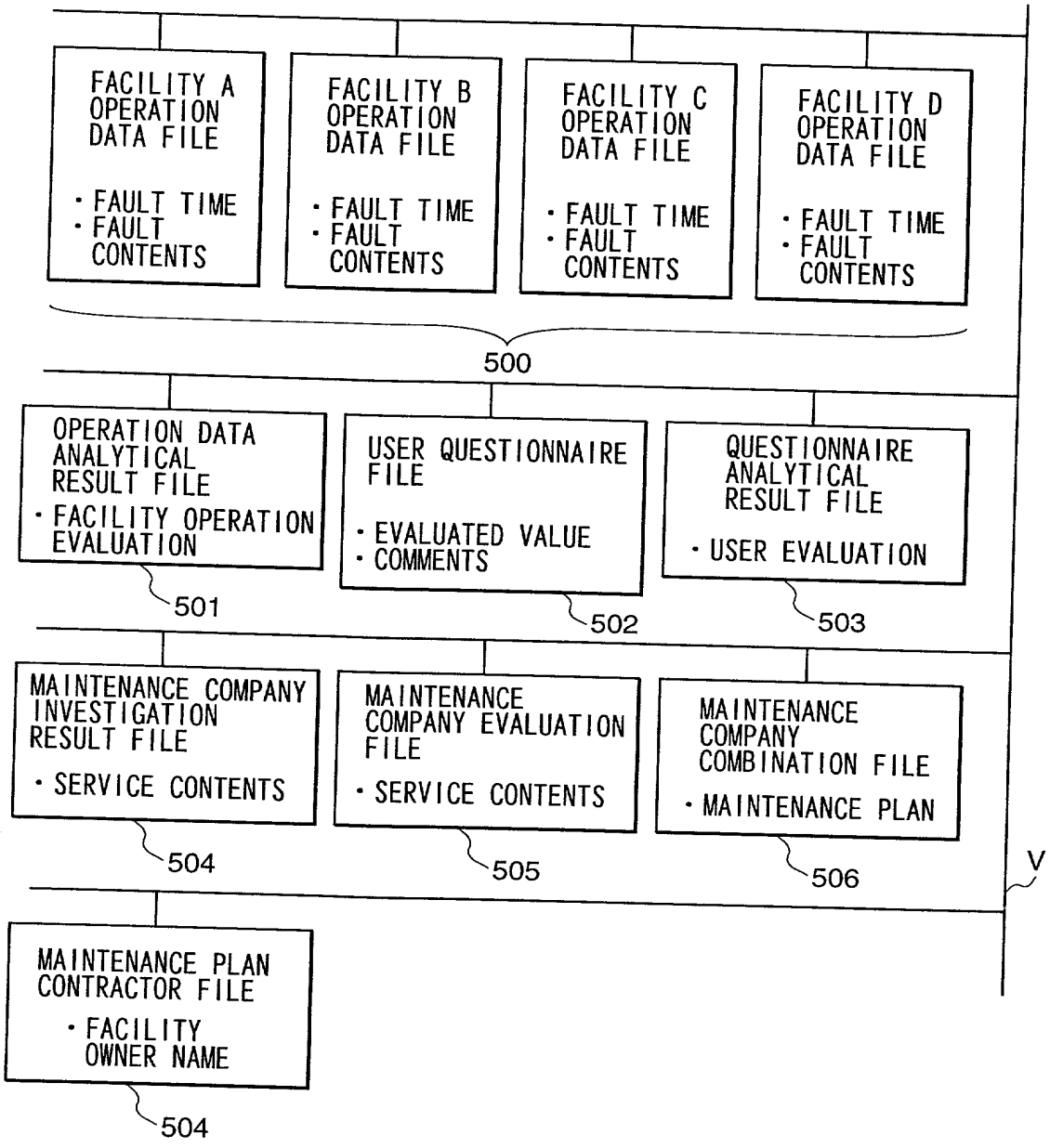

FACILITY A OPERATION DATA FILE
・FAULT TIME
・FAULT CONTENTS
FACILITY B OPERATION DATA FILE
・FAULT TIME
・FAULT CONTENTS
FACILITY C OPERATION DATA FILE
・FAULT TIME
・FAULT CONTENTS
FACILITY D OPERATION DATA FILE
・FAULT TIME
・FAULT CONTENTS
500
OPERATION DATA ANALYTICAL RESULT FILE
・FACILITY OPERATION EVALUATION
501
USER QUESTIONNAIRE FILE
・EVALUATED VALUE
・COMMENTS
502
QUESTIONNAIRE ANALYTICAL RESULT FILE
・USER EVALUATION
503
MAINTENANCE COMPANY INVESTIGATION RESULT FILE
・SERVICE CONTENTS
504
MAINTENANCE COMPANY EVALUATION FILE
・SERVICE CONTENTS
505
MAINTENANCE COMPANY COMBINATION FILE
・MAINTENANCE PLAN
506
V
MAINTENANCE PLAN CONTRACTOR FILE
・FACILITY OWNER NAME
504

FIG. 9

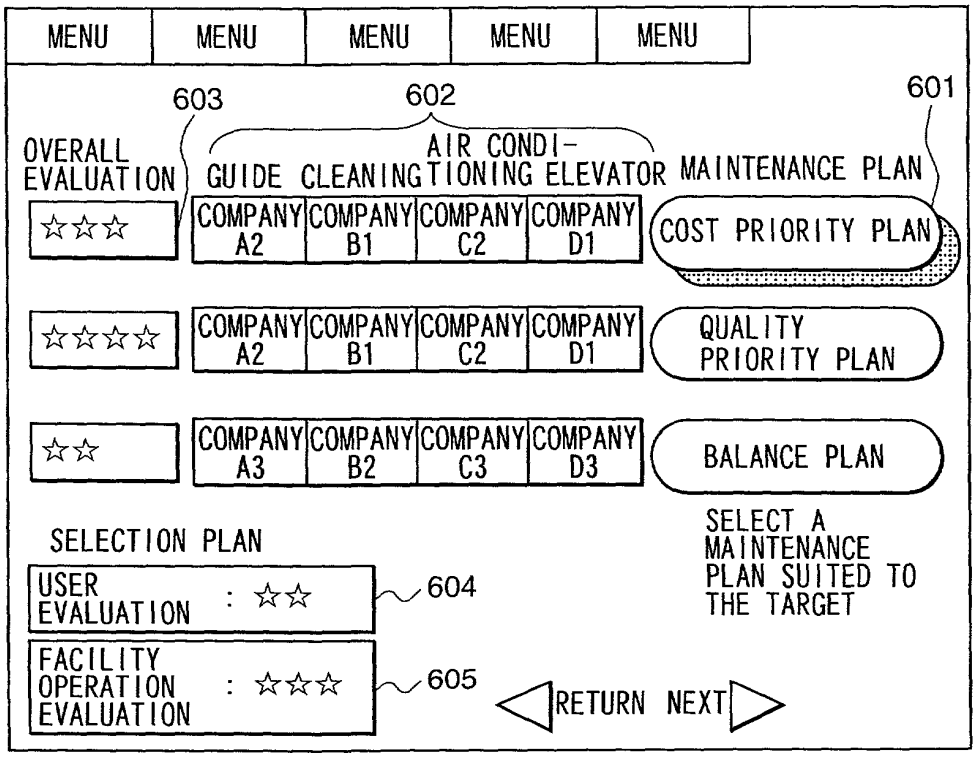

MENU
MENU
MENU
MENU
MENU
603
602
601
OVERALL EVALUATION
AIR CONDI-
GUIDE CLEANING TIONING ELEVATOR MAINTENANCE PLAN
☆☆☆
COMPANY A2
COMPANY B1
COMPANY C2
COMPANY D1
COST PRIORITY PLAN
☆☆☆☆
COMPANY A2
COMPANY B1
COMPANY C2
COMPANY D1
QUALITY PRIORITY PLAN
☆☆
COMPANY A3
COMPANY B2
COMPANY C3
COMPANY D3
BALANCE PLAN
SELECTION PLAN
SELECT A MAINTENANCE PLAN SUITED TO THE TARGET
USER EVALUATION : ☆☆
604
FACILITY OPERATION EVALUATION : ☆☆☆
605
RETURN
NEXT

FIG. 14

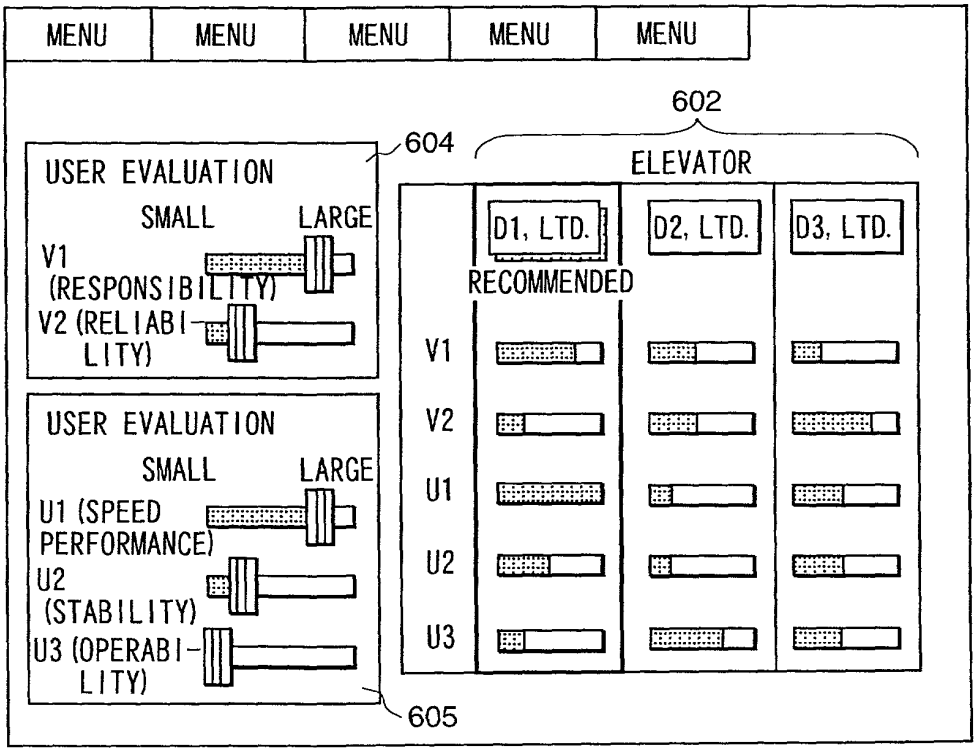

MENU
MENU
MENU
MENU
MENU
602
604
ELEVATOR
USER EVALUATION
SMALL
LARGE
V1 (RESPONSIBILITY)
V2 (RELIABILITY)
D1, LTD.
D2, LTD.
D3, LTD.
RECOMMENDED
V1
V2
U1
U2
U3
USER EVALUATION
SMALL
LARGE
U1 (SPEED PERFORMANCE)
U2 (STABILITY)
U3 (OPERABILITY)
605

FIG. 10

#	ITEM/EVALUATION ELEVATOR	Ta	Tb	Tc	Td	···
1	TRAVEL TIME	X1a	X1b	X1c	X1d	···
2	TRAVEL DISTANCE	X2a	X2b	X2c	X2d	···
3	TOTAL START COUNT	X3a	X3b	X3c	X3d	···
4	ELEVATOR CURRENT SUPPLY TIME	X4a	X4b	X4c	X4d	···
5	FLUORESCENT LAMP LIGHTING COUNT	X5a	X5b	X5c	X5d	···
6	FLUORESCENT LAMP CURRENT SUPPLY TIME	X6a	X6b	X6c	X6d	···
7	POWER FAILURE COUNT	X7a	X7b	X7c	X7d	···
8	LONGEST POWER FAILURE CONTINUOUS TIME	X8a	X8b	X8c	X8d	···
9	TOTAL OPEN BUTTON OPERATION COUNT	X9a	X9b	X9c	X9d	···
10	TOTAL CLOSE BUTTON OPERATION COUNT	X10a	X10b	X10c	X10d	···
11	TOTAL OPEN EXTENSION OPERATION COUNT	X11a	X11b	X11c	X11d	···
12	MAINTENANCE SWITCHING OPERATION COUNT	X12a	X12b	X12c	X12d	···
13	STOP SWITCHING OPERATION COUNT	X13a	X13b	X13c	X13d	···
14	MEAN TEMPERATURE	X14a	X14b	X14c	X14d	···
15	DOOR OPENING AND CLOSING COUNT	X15a	X15b	X15c	X15d	···
16	DOOR REVERSE COUNT	X16a	X16b	X16c	X16d	···
17	DOOR OPENING AND CLOSING ACCELERATION	X17a	X17b	X17c	X17d	···
18	DOOR OPENING AND CLOSING TIME	X18a	X18b	X18c	X18d	···
19	FLOOR ARRIVAL ERROR	X19a	X19b	X19c	X19d	···
20	ACCELERATION TIME	X20a	X20b	X20c	X20d	···
21	TRAVEL SPEED	X21a	X21b	X21c	X21d	···
22	SPEED VARIATION	X22a	X22b	X22c	X22d	···
23	DECELERATION TIME	X23a	X23b	X23c	X23d	···

FIG. 11

#	ITEM/SET VALUE	1	2	3	4	5
1	WAITING TIME	LONG	SLIGHTLY LONG	NORMAL	SLIGHTLY SHORT	SHORT
2	RIDING TIME	UNSUI-TABLE	—	NEITHER	—	SUITABLE
3	BUTTON OPERABILITY	UNSUI-TABLE	—	NEITHER	—	SUITABLE
4	INDICATOR DISPLAY	UNSUI-TABLE	—	NEITHER	—	SUITABLE
5	DOOR OPENING AND CLOSING TIME	UNSUI-TABLE	—	NEITHER	—	SUITABLE
6	DOOR OPENING AND CLOSING SPEED	UNSUI-TABLE	—	NEITHER	—	SUITABLE
7	CAGE SPEED	UNSUI-TABLE	—	NEITHER	—	SUITABLE
8	CAGE ACCELERATION	UNSUI-TABLE	—	NEITHER	—	SUITABLE
9	VIBRATION	FELT	—	SLIGHTLY FELT	—	NOT FELT
10	FLOOR ARRIVAL LEVEL DIFFERENCE	YES	—	SLIGHTLY	—	NO
11	RIDE QUALITY	BAD	SLIGHTLY BAD	NORMAL	SLIGHTLY GOOD	GOOD
12	NOISE	NOISY	SLIGHTLY NOISY	NORMAL	SLIGHTLY QUIET	QUIET
13	VIBRATION	YES	—	SLIGHTLY	—	NO
14	TEMPERATURE	BAD	SLIGHTLY BAD	NORMAL	SLIGHTLY GOOD	GOOD
15	BRIGHTNESS	UNSUI-TABLE	—	NEITHER	—	SUITABLE
16	SMELL	FELT	—	SLIGHTLY FELT	—	NOT FELT
17	SOIL	FELT	—	SLIGHTLY FELT	—	NOT FELT
18	INTERIOR DECORATION	BAD	SLIGHTLY BAD	NORMAL	SLIGHTLY GOOD	GOOD
19	EXTERIOR DECORATION	BAD	SLIGHTLY BAD	NORMAL	SLIGHTLY GOOD	GOOD
20	COUNTERMEASURE FOR LOITERER	BAD	SLIGHTLY BAD	NORMAL	SLIGHTLY GOOD	GOOD
21	VOICE GUIDE	NOT HEARD	—	NORMAL	—	HEARD

EP 2 332 862 A1

FIG. 12

#	ITEM/ESTIMATOR	Pa	Pb	Pc	Pd	···
1	WAITING TIME	Y1a	Y1b	Y1c	Y1d	···
2	RIDING TIME	Y2a	Y2b	Y2c	Y2d	···
3	BUTTON OPERABILITY	Y3a	Y3b	Y3c	Y3d	···
4	INDICATOR DISPLAY	Y4a	Y4b	Y4c	Y4d	···
5	DOOR OPENING AND CLOSING TIME	Y5a	Y5b	Y5c	Y5d	···
6	DOOR OPENING AND CLOSING SPEED	Y6a	Y6b	Y6c	Y6d	···
7	CAGE SPEED	Y7a	Y7b	Y7c	Y7d	···
8	CAGE ACCELERATION	Y8a	Y8b	Y8c	Y8d	···
9	VIBRATION	Y9a	Y9b	Y9c	Y9d	···
10	FLOOR ARRIVAL LEVEL DIFFERENCE	Y10a	Y10b	Y10c	Y10d	···
11	RIDE QUALITY	Y11a	Y11b	Y11c	Y11d	···
12	NOISE	Y12a	Y12b	Y12c	Y12d	···
13	VIBRATION	Y13a	Y13b	Y13c	Y13d	···
14	TEMPERATURE	Y14a	Y14b	Y14c	Y14d	···
15	BRIGHTNESS	Y15a	Y15b	Y15c	Y15d	···
16	SMELL	Y16a	Y16b	Y16c	Y16d	···
17	SOIL	Y17a	Y17b	Y17c	Y17d	···
18	INTERIOR DECORATION	Y18a	Y18b	Y18c	Y18d	···
19	EXTERIOR DECORATION	Y19a	Y19b	Y19c	Y19d	···
20	COUNTERMEASURE FOR LOITERER	Y20a	Y20b	Y20c	Y20d	···
21	VOICE GUIDE	Y21a	Y21b	Y21c	Y21d	···

Translation of JP2020-52744

FIG. 13

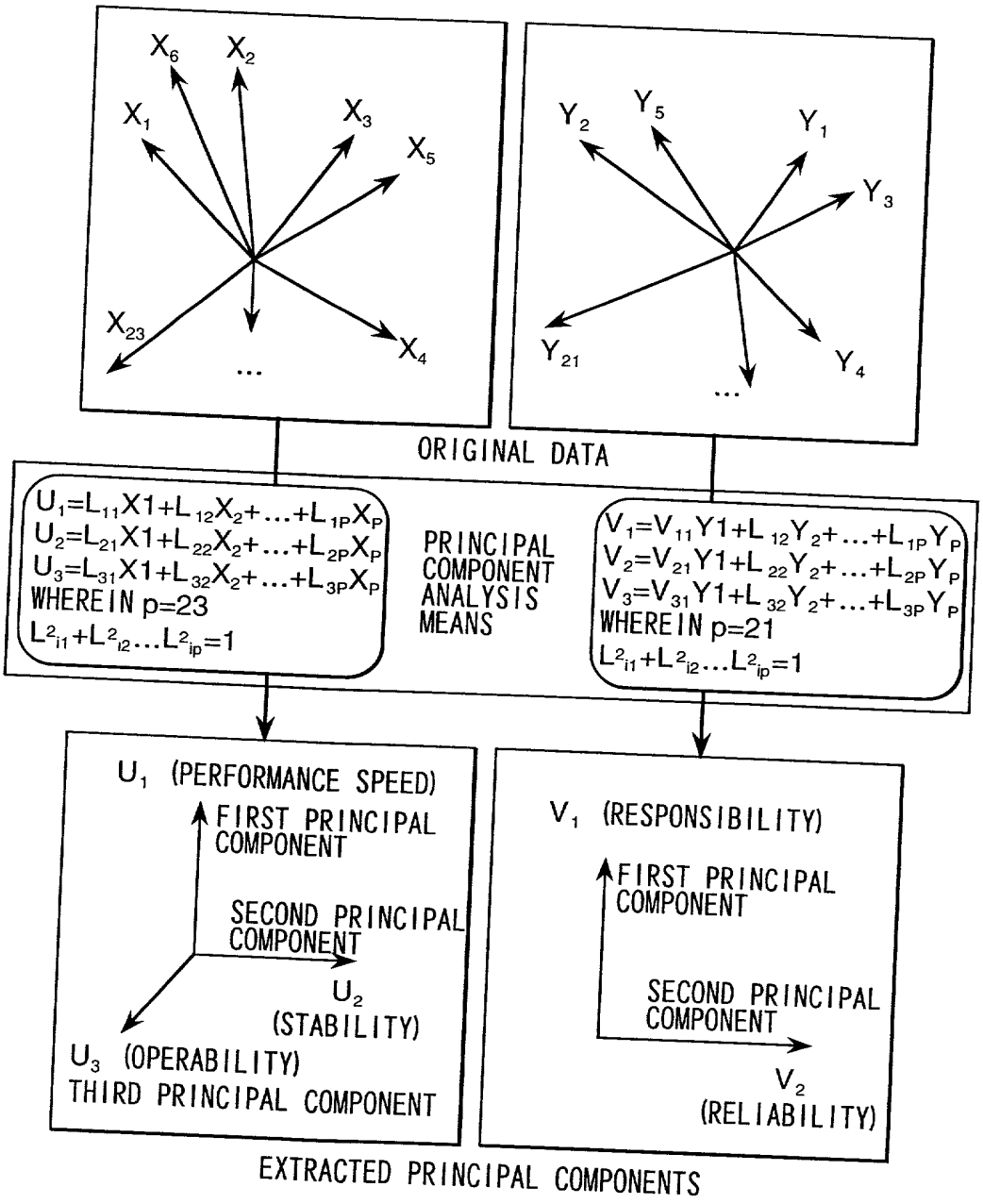

X6
X2
X1
X3
X5
X23
X4
...
Y2
Y5
Y1
Y3
Y21
Y4
...
ORIGINAL DATA
U1=L11X1+L12X2+...+L1PXP
U2=L21X1+L22X2+...+L2PXP
U3=L31X1+L32X2+...+L3PXP
WHEREIN p=23
L2i1+L2i2...L2ip=1
PRINCIPAL COMPONENT ANALYSIS MEANS
V1=V11Y1+L12Y2+...+L1PYP
V2=V21Y1+L22Y2+...+L2PYP
V3=V31Y1+L32Y2+...+L3PYP
WHEREIN p=21
L2i1+L2i2...L2ip=1
U1 (PERFORMANCE SPEED)
FIRST PRINCIPAL COMPONENT
SECOND PRINCIPAL COMPONENT
U2
(STABILITY)
U3 (OPERABILITY)
THIRD PRINCIPAL COMPONENT
V1 (RESPONSIBILITY)
FIRST PRINCIPAL COMPONENT
SECOND PRINCIPAL COMPONENT
V2
(RELIABILITY)
EXTRACTED PRINCIPAL COMPONENTS

FIG. 15

#	ITEM/EVALUATION ELEVATOR	Ta	Tb	Tc	Td	···
1	OPERATING TIME	X1a	X1b	X1c	X1d	···
2	FAULT TIME	X2a	X2b	X2c	X2d	···
3	ENERGY CONSUMPTION	X3a	X3b	X3c	X3d	···
4	ENERGY UTILITY RATE	X4a	X4b	X4c	X4d	···
5	NO. OF MAINTENANCE OPERATORS	X5a	X5b	X5c	X5d	···
6	MAINTENANCE OPERATION RATE	X6a	X6b	X6c	X6d	···
7	NO. OF USERS	X7a	X7b	X7c	X7d	···
8	UTILITY RATE	X8a	X8b	X8c	X8d	···

FIG. 16

#	ITEM/SET VALUE	1	2	3	4	5
1	NOISE	NOISY	SLIGHTLY NOISY	NORMAL	SLIGHTLY SHORT	QUIET
2	VIBRATION	YES	—	SLIGHTLY	—	NO
3	SMELL	FELT	—	SLIGHTLY FELT	—	NOT FELT
4	SOIL	FELT	—	SLIGHTLY FELT	—	NOT FELT
5	COMFORTABLENESS	UNSUITABLE	—	NEITHER	—	SUITABLE
6	USE FARE	UNSUITABLE	—	NEITHER	—	SUITABLE

FIG. 17

#	ITEM/ESTIMATOR	Pa	Pb	Pc	Pd	···
1	NOISE	X1a	X1b	X1c	X1d	···
2	VIBRATION	X2a	X2b	X2c	X2d	···
3	SOIL	X3a	X3b	X3c	X3d	···
4	SMELL	X4a	X4b	X4c	X4d	···
5	COMFORTABLENESS	X5a	X5b	X5c	X5d	···
6	UTILITY RATE	X6a	X6b	X6c	X6d	···

FIG. 18

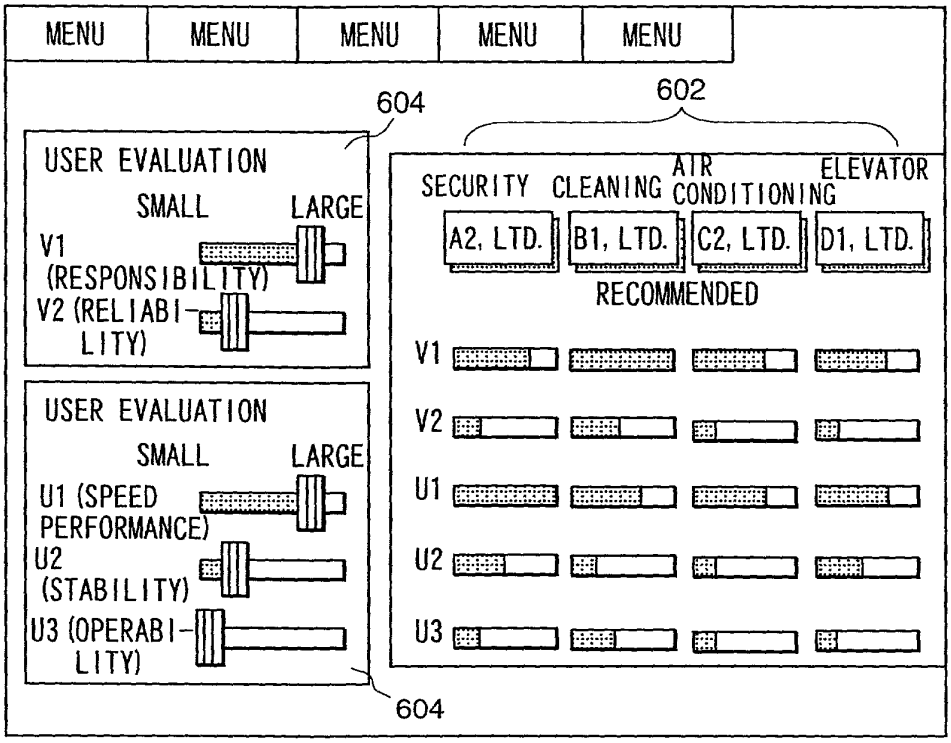

MENU
MENU
MENU
MENU
MENU
604
602
USER EVALUATION
SMALL
LARGE
V1 (RESPONSIBILITY)
V2 (RELIABILITY)
USER EVALUATION
SMALL
LARGE
U1 (SPEED PERFORMANCE)
U2 (STABILITY)
U3 (OPERABILITY)
604
SECURITY
CLEANING
AIR CONDITIONING
ELEVATOR
A2, LTD.
B1, LTD.
C2, LTD.
D1, LTD.
RECOMMENDED
V1
V2
U1
U2
U3

FIG. 19

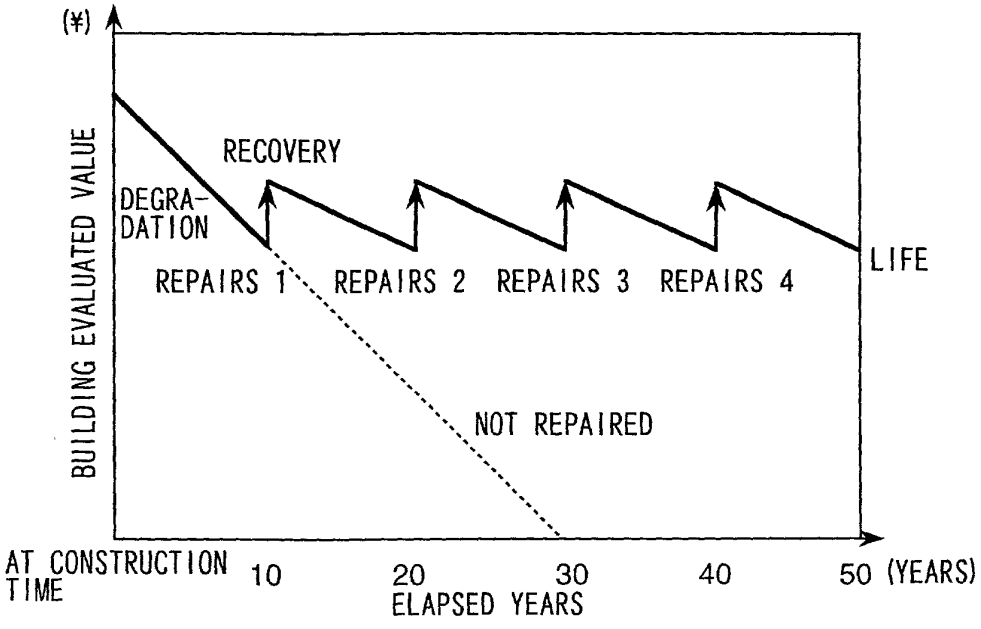

(¥)
BUILDING EVALUATED VALUE
RECOVERY
DEGRADATION
REPAIRS 1
REPAIRS 2
REPAIRS 3
REPAIRS 4
LIFE
NOT REPAIRED
AT CONSTRUCTION TIME
10
20
30
40
50 (YEARS)
ELAPSED YEARS

FIG. 20

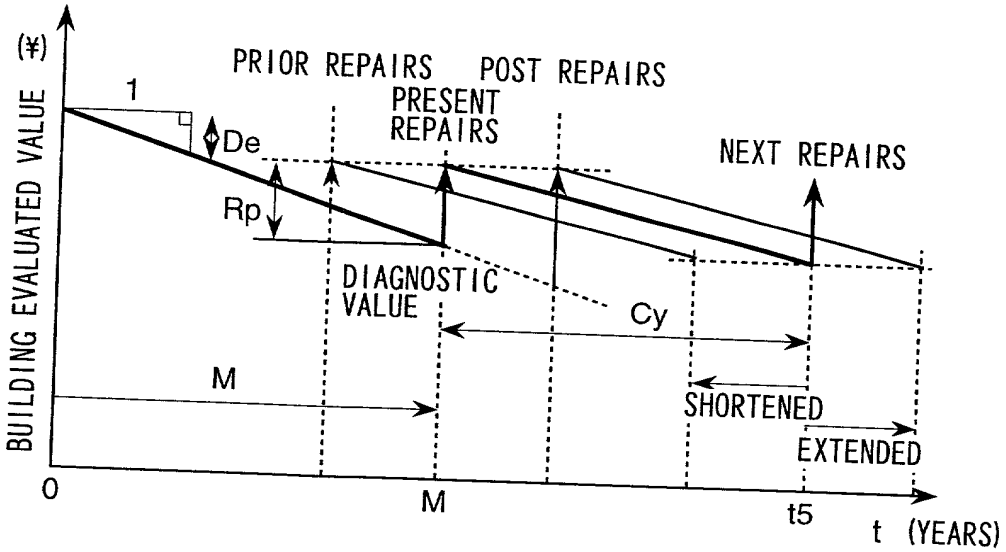

(¥)
BUILDING EVALUATED VALUE
1
De
Rp
PRIOR REPAIRS
PRESENT REPAIRS
POST REPAIRS
NEXT REPAIRS
DIAGNOSTIC VALUE
Cy
M
SHORTENED
EXTENDED
0
M
t5
t (YEARS)

FIG. 23

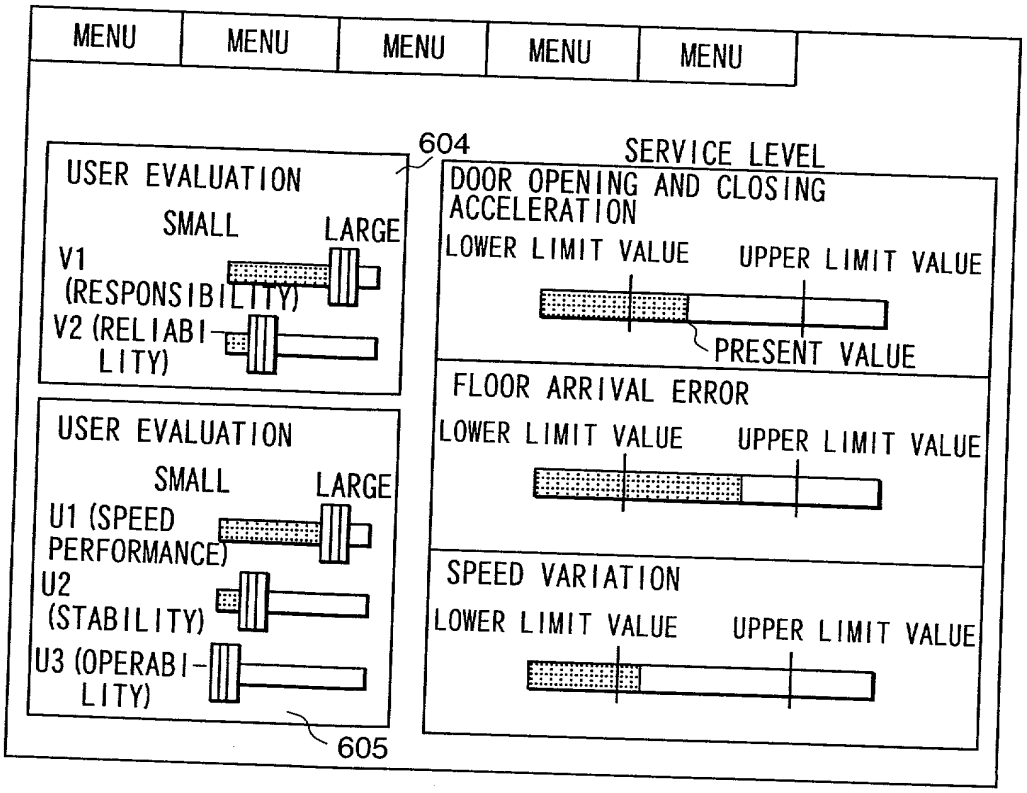

MENU
MENU
MENU
MENU
MENU
604
SERVICE LEVEL
USER EVALUATION
SMALL
LARGE
V1 (RESPONSIBILITY)
V2 (RELIABILITY)
DOOR OPENING AND CLOSING ACCELERATION
LOWER LIMIT VALUE
UPPER LIMIT VALUE
PRESENT VALUE
FLOOR ARRIVAL ERROR
LOWER LIMIT VALUE
UPPER LIMIT VALUE
USER EVALUATION
SMALL
LARGE
U1 (SPEED PERFORMANCE)
U2 (STABILITY)
U3 (OPERABILITY)
SPEED VARIATION
LOWER LIMIT VALUE
UPPER LIMIT VALUE
605

FIG. 21

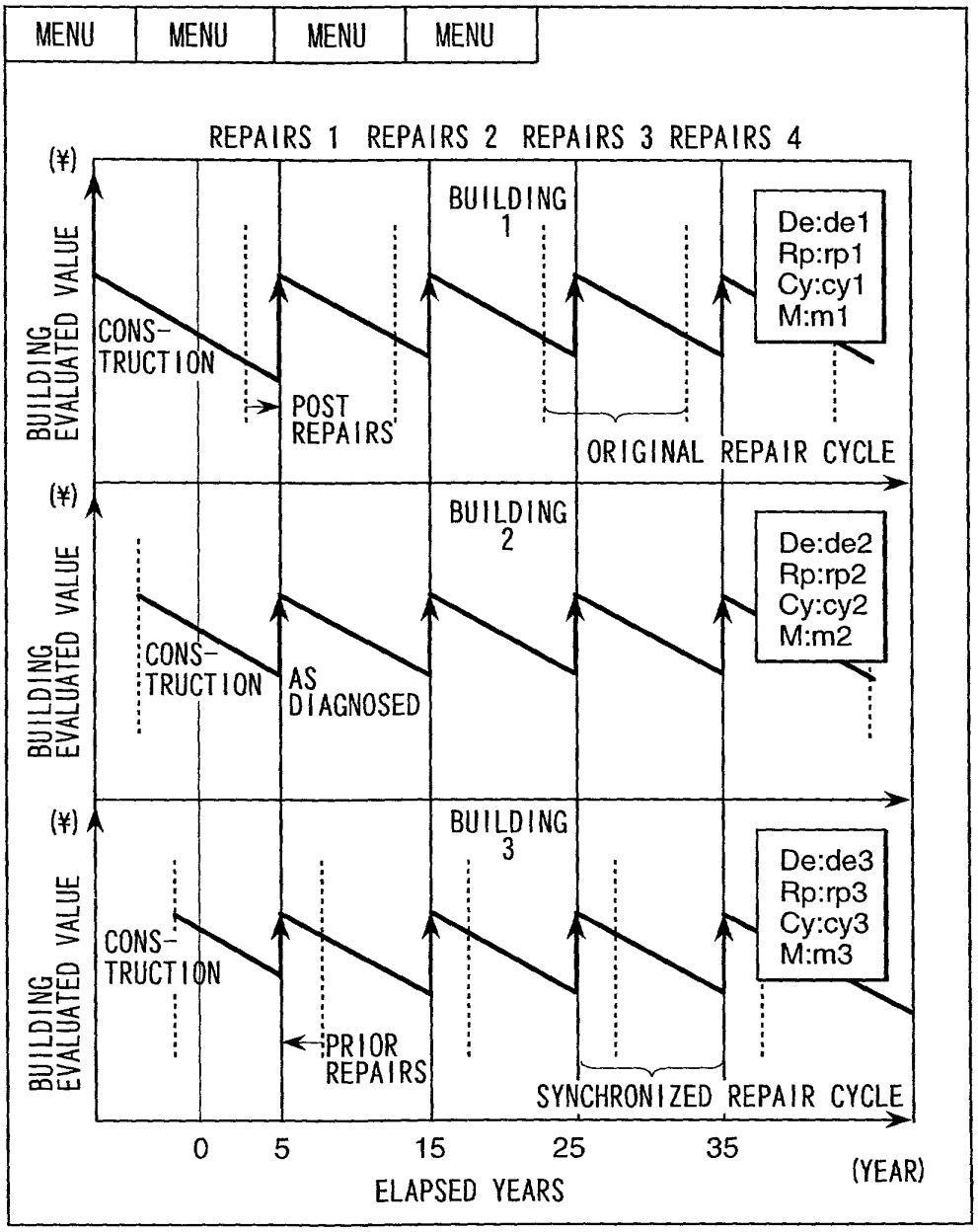
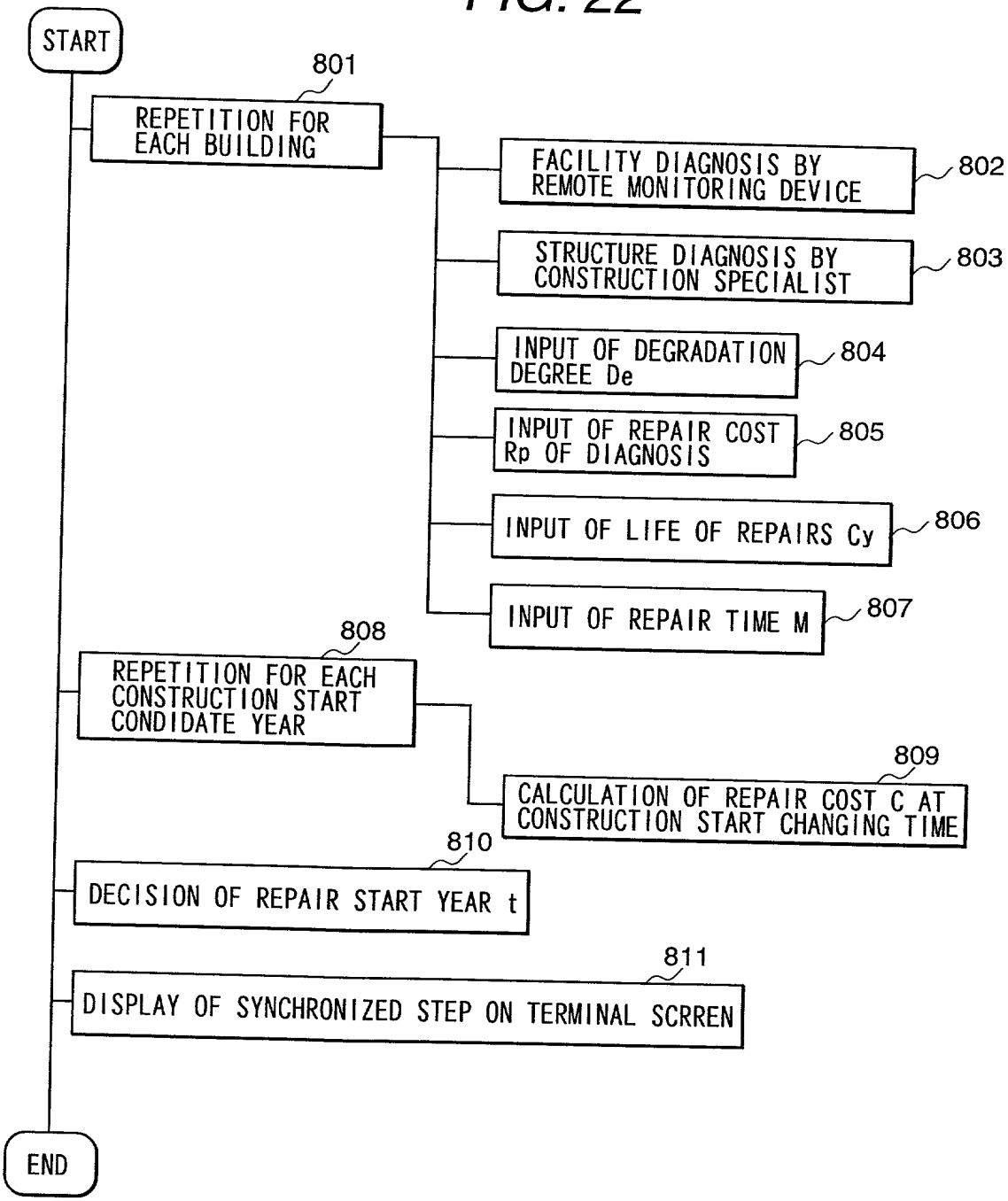

MENU
MENU
MENU
MENU
REPAIRS 1
REPAIRS 2
REPAIRS 3
REPAIRS 4
(¥)
BUILDING EVALUATED VALUE
BUILDING 1
De:de1
Rp:rp1
Cy:cy1
M:m1
CONS-TRUCTION
POST REPAIRS
ORIGINAL REPAIR CYCLE
BUILDING 2
De:de2
Rp:rp2
Cy:cy2
M:m2
CONS-TRUCTION
AS DIAGNOSED
BUILDING 3
De:de3
Rp:rp3
Cy:cy3
M:m3
CONS-TRUCTION
PRIOR REPAIRS
SYNCHRONIZED REPAIR CYCLE
0
5
15
25
35
(YEAR)
ELAPSED YEARS

FIG. 22


START
801
REPETITION FOR EACH BUILDING
FACILITY DIAGNOSIS BY REMOTE MONITORING DEVICE
802
STRUCTURE DIAGNOSIS BY CONSTRUCTION SPECIALIST
803
INPUT OF DEGRADATION DEGREE De
804
INPUT OF REPAIR COST Rp OF DIAGNOSIS
805
INPUT OF LIFE OF REPAIRS Cy
806
INPUT OF REPAIR TIME M
807
808
REPETITION FOR EACH CONSTRUCTION START CONDIDATE YEAR
809
CALCULATION OF REPAIR COST C AT CONSTRUCTION START CHANGING TIME
810
DECISION OF REPAIR START YEAR t
811
DISPLAY OF SYNCHRONIZED STEP ON TERMINAL SCRREN
END